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CANUSA-West Sponsors Model Review Workshops

CANUSA-West has been developing models that incorporate budworm research results into a decision-support system for western resource managers and planners. The model-building process was supported by the following series of workshops:

- December 7-9, 1982: Budworm-stand model linkage — foliage distribution and production; defoliation effects on growth and yield
- December 14-16, 1982: Foliage growth and budworm feeding
- January 25-27, 1983: Natural enemies
- February 23-24, 1983: Adult dispersal
- March 29-30, 1983: Outbreak occurrence

These five workshops were designed to bring researchers and the modelling team together to assure accurate and compatible assimilation of research results. Following each workshop, the modelling team produced a summary report that allowed researchers to review the material they had presented to the modelling team and to ensure that any misinterpretations were corrected.

Two review workshops followed. The University of Idaho's College of Forestry, Wildlife and Range Sciences hosted workshops in June and July to allow researchers and users to view the models and criticize their form, content, and input/output format.

In June, reviewers and users were those who had been working with the program and were familiar with the modelling work. Most attended one or more of the earlier, information-gathering workshops.

In July, we chose a group familiar with the budworm problem and/or model development, but at the same time we tried to choose a group independent of our earlier developmental work — one that would be unbiased and provide us with an objective review of our work.

Initial documentation of these models will be produced in late summer, and review drafts will be circulated in September. The user guides and related publications are planned for Fiscal Year 1984.

Jim Colbert — Research Coordinator
CANUSA-West
Portland, Oreg.

Western Survey and Sampling Workshop

Western forest pest managers met with CANUSA-West researchers to discuss the results available for improving western spruce budworm sampling procedures. After users described some recent problems in sampling and interpretation of sample results, researchers presented their most recent findings.

Robert W. Campbell, of the Pacific Northwest Forest and Range Experiment Station (PNW), Corvallis, and Nilima Srivastava, his University of Idaho cooperator, presented a new sequential classification scheme for predicting future defoliation. They also presented sequential count plans for larvae, pupae, and egg masses. These are being incorporated into a "how-to" publication written by Dan Twardus (Forest Pest Management, Region 6), Nilima, and Bob.

Research results relevant to sampling were presented by John Schmid (Rocky Mountain Forest and Range Experiment Station, Flagstaff, Ariz.), Jan Volney (University of California, Berkeley), Roy Beckwith (PNW at LaGrande, Oreg.), and Gary Daterman and Charles Sartwell (PNW, Corvallis, Oreg.). Two manuscripts by George Markin and others were presented. These papers dealt with sampling problems — changes in sample branch form resulting from prior defoliation and changes in sample branch form resulting from repeated sampling.

Dan Twardus presented results of a comparison he had made of these sequential count plans and a fixed plot size plan for egg masses. He then described the proposed 1983 validation/calibration study he has carried out in Eastern Oregon. These studies were used as a basis for discussions of planned validation/calibration studies to be carried out in several western locations in 1984. Users were interested in seeing these studies done in 1984 and felt that they would accelerate the transfer of these new methods and assure accurate assimilation of the new procedures.

Jim Colbert — Research Coordinator
CANUSA-West
Portland, Oreg.

Vermont and Forest Service Join in Demo Project

The State of Vermont and the U.S. Government are sponsoring a cooperative demonstration project to combat spruce budworm problems in the forests of the Green Mountain State.

An agreement to join forces in what could be a multiyear program was reached by the Vermont Department of Forests, Parks and Recreation, and the USDA Forest Service. Together, they hope to reduce the susceptibility of spruce-fir stands to the ravages of spruce budworm.

The demonstration project is in addition to a spray program conducted in the State early in June.

Each year, budworms kill more than \$4 million worth of trees through defoliation in Vermont, where the infestation now covers about 62 000 ha (153,000 acres). In addition to the dollar figure for lost timber, the budworm is responsible for damage

to the area's esthetics and to deer yards, critical deer winter habitats that provide food and thermal protection. Special attention is given to protecting deer yards because deer are a valuable State resource.

The Forest Service and the State each will provide half of the \$100,000 cost for the 1983 phase of the demonstration project. Forest Service funding for 1983 was supplied by CANUSA. Federal financial participation beyond this year will depend on the availability of funds.

Demonstration activities will be concentrated on about 50 600 ha (125,000 acres) in the Towns of Hyde Park, Eden, Wolcott, Greensboro, Hardwick, Walden, Stannard, and Wheelock in the counties of Lamoille, Orleans, and Caledonia.

Thomas N. Schenarts, Northeastern Area Director for the Forest service, said that the demonstration will meet Vermont's long- and short-term needs in the management of forest resources. Further, it will promote creation of budworm-resistant forests and provides for continuous deer management and foliage protection.

The demonstration project has four components: advanced training for State, private consulting, and industrial foresters; budworm population monitoring; accelerated small-woodlot management; and a spruce budworm spray program in which 202 ha (500 acres) will be sprayed with B.t. during 1983. Some of the pest management and forest management techniques being demonstrated in this project were developed with CANUSA dollars. Techniques to be used in the project were selected from an environmental analysis, as required by the National Environmental Policy Act.

The Cooperative demonstration project stems from a request by the Vermont Department of Forests, Parks and Recreation for USDA Forest Service financial assistance for a long-term integrated pest management program to deal with budworm.

Forest Service Chief Max Peterson Delivers Weyerhaeuser Lecture to U of T Forestry Faculty

The CANUSA Spruce Budworms Program figured prominently in Max Peterson's address in the University of Toronto Forestry Faculty's latest Weyerhaeuser Lecture Series. With a common heritage and common problems in forestry, Max explained that it was only natural that a joint undertaking of this nature and magnitude would result. He had praise for the senior administrators of both countries for conceiving the Program, and for the scientists on both sides of the international border for effectively implementing the joint endeavor. In part he said, "Since 1977, we have pooled U.S. and Canadian expertise and facilities in a joint effort to deal with spruce budworm problems on both sides of the border — an effort called CANUSA. Because it involves the capabilities of both nations, this is probably the largest research

and development program ever undertaken in forestry. Altogether it has involved six forest experiment stations in the United States and all Canadian forestry research centers, scientists at several universities on both sides of the border, and the facilities of several Provincial and State governments; roughly 300 scientists in all.

CANUSA's primary objective is to design and evaluate various means for controlling the budworm or for reducing the vulnerability of susceptible forests. The Program has produced some new information and improved technologies, established some better systems for monitoring budworm populations, and further developed the biological insecticide, *Bacillus thuringiensis*. Altogether, the quality of CANUSA research has been quite high, and the Program has been very successful. We have extended the Program for another year, to disseminate the extensive amounts of information and technology it has developed."

The Spruce Budworm and Fire Risks

In 1979, the CFS Task Force recommended, as a component in the short-term planning process, a research program "to define fire behavior in budworm-damaged stands so that fire managers can allocate their resources accordingly." This was to be accomplished by expanding the studies then in existence to include a wider spectrum of regional conditions, and to integrate detection processes.

Because of the assumed fire risk of decadent, spruce-budworm-attacked stands, the Implementation Team promoted the expansion of studies underway at Great Lakes Forest Research Centre (GLFRC) and Newfoundland Forest Research Centre to include other high-impact areas, specifically in Quebec and Cape Breton Island. Brian Stocks, GLFRC, became the coordinator.

Historical records indicate that severe forest fires often followed spruce budworm infestations, such as the Miramichi Fire of 1825, New Brunswick, and the Chapleau-Mississagi Fire of 1948, Ontario. Fire managers have been divided, however, whether or not there is a significant fire risk associated with severe and prolonged budworm attack. The study objective was to define, in precise terms, the fuel capacity, fire behavior, and resistance to control of the fuel type.

Research was conducted on the problem in two ways: (1) by examining the behavior of wildfires; and (2) by conducting experimental burns. Except in Ontario, efforts in the latter method were frustrated by the reluctance of fire authorities to permit controlled experimental burning.

The results are, therefore, an extrapolation from results obtained from the main study sites in Ontario.

Extensive sampling of all aerial, surface, and ground fuels preceded controlled burning on all study sites, and these data provided the basis for the prediction of fire risk and behavior in areas where burning was not permitted. The ecological succession following a burn is also important and this has been documented in natural and deliberate burns.

A section in "Managing the Spruce Budworm in Eastern North America," currently in preparation, will provide resource managers with guidelines on managing fire risk following budworm-induced mortality. Results can generally be applied over a fairly extensive geographic range. Preliminary indications are that budworm-decadent forests in their early stages of disintegration present a considerable fire hazard, especially early in the year before the flush of ground vegetation reduces the ground fuel capacity.

The Budworm in Newfoundland

Egg-mass and overwintering larval surveys showed that the budworm attack continues to cause moderate to severe defoliation in about 100 000 ha (247,100 acres) distributed in isolated patches from the Codroy Valley to the Humber Canal near Deer Lake. Based on present tree conditions and defoliation in 1983, the area of moderate to high hazard is forecast to be about 165 000 ha (407,715 acres).

In Labrador, moderate to severe defoliation occurred in about 1000 ha (2,471 acres) along Beaver River and the moderate-to high-hazard area is about the same. Tree mortality continues in stands damaged by the spruce budworm and now under attack by secondary pests.

In 1982, pheromone traps were used to detect spruce budworm moth flights to the Island from other provinces. Traps again were placed in selected stands throughout the Island in 1983 to assist in locating any moth flights.

A CANUSA Spin Off

Across-the-border cooperation in the pesticide research and registration area, pioneered in the CANUSA Spruce Budworms Program, has now been extended to include herbicides in forest management. Jim Stewart, Director of Forest Pest Management, USDA Forest Service, Washington, D.C.; and George Green, Director, Forest Pest Management Institute, Canadian Forestry Service, Sault Ste. Marie, Ont., have been designated as contact persons within their respective organizations to facilitate this interchange.

The first informal meeting was held at the Forest Pest Management Institute on May 4-5, 1983. Attending from the U.S. side were Fred Honing, Assistant Director, Forest Pest Management; Al Rivas, Liaison Officer, Legal Matters; Jack Barry, Spray Applications Technology; Dennis Hamel, Specialist, Herbicides and Related Chemicals; Larry Gross, Specialist, Insecticides and Related Materials;

and John Neisess, who is involved with the RPAR process. The Canadian Forestry Service was represented by George Green, Jack Armstrong, Terry Ennis, Phillip Reynolds, Raj Prasad, Leo Cadogan, Somu Sundaram, and Peter Kingsbury. Discussions were wide-ranging and included such topics as pesticide registration, impact evaluation, technology transfer, social and environmental concerns, gaps in available information, sharing of herbicide use data, possibilities of joint research, and many other related topics.

CANUSA-West at the Ent Soc

At the annual meeting of the Pacific Branch of the Entomological Society of America, held June 21-23, 1983, in Spokane, CANUSA researchers presented three papers documenting results of their investigations. Bob Campbell discussed population dynamics of the western spruce budworm in a symposium on forest insect outbreaks in the Pacific Northwest. Tom Egan, Oregon State University (OSU), gave a paper coauthored with Roy Beckwith of the Forest Service at LaGrande, Oreg., on sampling overwintering budworm larvae. Lorna Youngs (OSU) gave a paper on ant predators of the western spruce budworm. Ron Stark, Program Manager for the western U.S. component, spoke on outbreaks of the larch casebearer in the Pacific Northwest.

Spruce Budworms Symposium

Plans for CANUSA's international scientific symposium, to be held in the Holiday Inn, Bangor, Maine, September 18-21, 1984, are now well advanced. By now, most of the scientific community and interested users have received the initial invitation package that was mailed from the University of Maine at Orono in July. The program cochairmen, Ron Stark and Chris Sanders, have lined up keynote speakers, and they expect to receive drafts of their addresses well in advance of the event so that the Proceedings can be published as quickly as possible afterward. As well as the poster sessions, a series of planned workshops has been added to the agenda. Mark your calendar and plan to attend and participate.

1985 Meeting of Society of Invertebrate Pathologists

The Society of Invertebrate Pathologists (SIP) will be holding its 1985 Annual Meeting in Sault Ste. Marie, Ont. This is an important event, as over the years the insect pathology group at the Forest Pest Management Institute has made significant contributions to the Society. The Sault group is one of the largest and most diverse in specialty within the society, and the facilities and expertise centered in Sault Ste. Marie are equalled by few other insect

pathology laboratories in North America. Terry Ennis has been asked to chair the organizing committee and, with the assistance of FPMI pathologists, he will be developing a program that will be a fitting tribute to the lead role the CFS has provided in developing insect pathogens for use in controlling forest insect pests.

In the Family

Five scientists at the Forest Service's Pacific Southwest Forest and Range Experiment Station (Berkeley, Calif.) received the first annual Distinguished Publications Award from the Station's Committee of Scientists. Three of those five recipients are CANUSAns: Jackie Robertson, Mike Haverty, and Charlie Richmond. The winners received specially designed walnut plaques with a unique laser engraving of a pine bough and the Forest Service shield. An inset brass plate carried the title of the publication and the names of the author(s).

Of the 16 nominated publications, here are the three CANUSA-related winners:

Robertson, Jacqueline L.; Haverty, Michael I. Estimation of rates and times of application for selected insect growth regulator formulations applied to western spruce budworm. *J. Ga. Entomol. Soc.* 17(3); 1982. (July issue.)

Haverty, Michael I.; Robertson, Jacqueline L. Laboratory bioassays for selecting candidate insecticides and application rates for field tests on the western spruce budworm. *J. Econ. Entomol.* 75(2); 1982. (April issue.)

Richmond, Charles E. Simulating aerial sprays for the western spruce budworm (Lepidoptera: Tortricidae): evaluation of technique and two candidate insecticides. *Can. Entomol.* 113; 1981. (September issue.)

Personnel

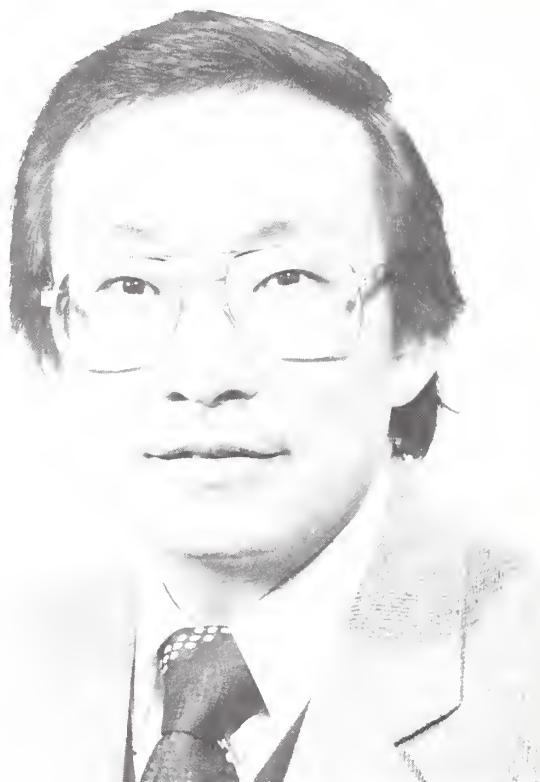
Les Reed's Term Extended as Assistant Deputy Minister, CFS

The Treasury Board has approved the extension of Les Reed's term as Assistant Deputy Minister, Canadian Forestry Service. This extension, which is made under the terms and conditions of the Executive Interchange Program, will be until August 14, 1984.

Kondo Succeeds Sterner

Ed Kondo has been appointed Director, Forest Insect and Disease Survey (FIDS), Ottawa, replacing Tom Sterner, who has moved to Victoria, B.C. Ed will be responsible for coordinating the national overviews of the FIDS program as well as serving on other organizations such as the Plant Quarantine Advisory Board and the North American Forestry Commission.

Ed joined the Canadian Forestry Service in 1969 as a forest pathologist at the Great Lakes Forest Research Centre in Sault Ste. Marie, Ont., where he



was involved mainly in Dutch elm disease research for 14 years. He joined the GLFRC management team in 1982 as research manager, Environmental Forestry and Fire, and was responsible for managing and directing research projects in forest pathology, acid rain, and fire research as well as managing the Biometrics and Application Software Services and the Computer Facilities and Services at GLFRC. He was recently on temporary assignment at CFS-HQ before his present appointment.

Two New Faces at FPMI

Richard Fleming has joined the staff at the Forest Pest Management Institute, Sault Ste. Marie, Ont., as Biological Systems Analyst. In that capacity, he will be conducting studies on the dynamic modelling of forest insect populations and interactions. He will also be working with staff members in the application of system analysis to a variety of entomological, pathological, chemical pesticide, and application technology problems. Before joining FPMI, Richard worked with the CANUSA Spruce Budworm Group in Orono, Maine, modelling the Maine spruce budworm population, and is therefore very familiar with the forestry area.

Nicholas Payne, FPMI's new expert in the Spray Cloud Behavior project, comes from Ecological Physics Research Group at the Cranfield Institute of Technology, Cranfield, England. He will be conducting research and computer simulation on the

behavior of emitted spray clouds as well as their interaction with the forest canopy. This aspect will be an integral part of FPML's Application Technology Program.

Jack Armstrong to Ottawa

Jack Armstrong, formerly Program Manager at FPML, has moved to CFS Headquarters, Ottawa, to assume the position of Pesticides Advisor. Jack has figured prominently in the CANUSA Program since its inception, and will certainly be an asset in his new position.

Items from the Press

"Possibly the largest helicopter spray operation ever undertaken in North America" has begun with the 1983 spruce budworm spray project in eastern Oregon.

The project is using as many as 29 spray helicopters and 12 observation helicopters to treat about 529,000 forest acres which are heavily infested with the destructive spruce budworm, said Paul Buffam, regional director of Forest Pest Management.

A 1968 spruce budworm spray project actually treated some 800,000 forested acres in Oregon and Washington, but most of that spray application was done with fixed-wing aircraft.

The massive spray project is a cooperative effort by the Forest Service and the Oregon Department of Forestry. About 150 Forest Service employees from National Forests throughout the Region have been detailed to help out with the project.

The first spraying began Sunday, June 12, and 22,580 acres of federal, state, and private land had been sprayed by June 16. It is estimated that spraying will take about 20 days, but the project may stretch over a two month period before 20 days of proper weather conditions are found. The main insecticide to be used is Sevin-4-Oil, which is commonly used for insect control in yards and gardens and on pets.

(The Greensheet — June 24, 1983)

USDA Forest Service, Pacific Northwest Region
Portland, Oregon

Newfoundland will spray Matacil. — The chemical pesticide Matacil will continue to be used in Newfoundland this year, Charlie Power, Minister of Lands and Forests, said recently.

Power said he is aware of concerns about the chemical in New Brunswick where a team of scientists appointed to study the relationship between pesticides and cancer have filed their interim report. The experts urged caution in using Matacil in spruce budworm spraying because there are questions to be answered about its effects.

As a result, the New Brunswick government has decided not to use Matacil until it has received a clean bill of health.

Power said the Newfoundland government has been advised by the provincial medical association and the federal Department of the Environment that Matacil is safe when properly used.

(Daily Gleaner — May 12, 1983)

Fredericton, N.B.

Spraying necessary, trial told. — Intense spruce budworm damage to Nova Scotia forests makes a successful reforestation program crucial, and the best way to do this involves herbicide spray, Dr. Michael Newton, professor of forest ecology at Oregon State University, told the herbicide spray trial in Sydney.

"The state of the forest (after devastation) by the budworm is an unmitigated disaster. It gives urgency to immediate reforestation, otherwise the forest base will be in very short supply," he said.

"Chemical (spraying) is more effective, probably safer and less likely to be costly" than manual alternatives in reforestation programs, he said.

Dr. Newton is the first witness for Nova Scotia Forest Industries (NSFI) which wants to spray reforested areas with the herbicides 2,4-D and 2,4,5-T. The herbicides kill hardwood trees and shrubs to allow valued softwoods unfettered growth.

NSFI lawyer George Cooper said the forest company believes there "is no scientific controversy about (the safety of) the chemicals", and will call 12 expert witnesses to prove this point.

Dr. Newton said manual clearing of replanted areas accidentally kills softwoods. Moreover, softwoods in manually cleared areas are two to three years behind the growth of softwoods on sprayed sites, he said.

(Chronicle-Herald — May 20, 1983)

Halifax, Nova Scotia.

Recent Publications

From Cooperative Forestry and Pest Management, Northern Region, USDA Forest Service, P.O. Box 7669, Missoula, MT 59807, you may request a copy of

Stipe, Lawrence, E., Christine G. Niwa, Robert G. Eder, Kenneth E. Gibson, and Hubert E. Meyer.

"Pilot project of *Bacillus thuringiensis* against western spruce budworm in Central Montana, 1981." Rep. 83-4. May 1983. 69 p.

From the USDA Forest Service, Southwestern Region, State and Private Forestry, Forest Pest Management, 517 Gold Avenue, SW, Albuquerque, NM 87102, comes

Telfer, William G., James P. Linnane, and James H. Davis. "Western spruce budworm suppression project — 1982, Carson National Forest and State and Private Lands in New Mexico." Rep. R-3 83-12. April 1983. 22 p. plus appendices.

The Intermountain Forest and Range Experiment Station, USDA Forest Service, 507 25th Street, Ogden, UT 84401, makes available free single copies of

Carlson, Clinton E., and Ward W. McCaughey. "Indexing western spruce budworm through radial increment analysis." Res. Pap. INT-291-FR-32.

Fellin, David G., and Paul W. Hengel. "Deploying pheromone-baited traps for the western spruce budworm and other defoliating insects." Res. Note INT-330. 1983. 8 p.

CANUSA's technology transfer team at the University of Michigan's School of Natural Resources (Ann Arbor, MI 48823) announces publication of the following brochure:

Flexner, J. L., J. R. Bassett, B. A. Montgomery, G. A. Simmons, and J.A. Witter. "Spruce-fir silviculture and the spruce budworm in the Lake States." Handb. 83-2. Ann Arbor, MI: Michigan Cooperative Forest Pest Management Program; 1983. 30 p.

The Northeastern Forest Experiment Station, USDA Forest Service, 370 Reed Road, Broomall, PA 19008, has released

Solomon, D. S., and R. M. Frank. "Growth response of managed uneven-aged northern conifer stands." Res. Pap. NE-517. Broomall, PA: USDA Forest Service, Northeastern Forest Experiment Station; 1983. 17 p.

Write to Gary Simmons, Department of Entomology, Michigan State University, East Lansing, MI 48824, for a copy of

Rogan, R. G., and G. A. Simmons. "The feasibility of audio-cassette tapes in technology transfer: the spruce budworm technology transfer program." Tech. Rep. 83-1. East Lansing, MI: Michigan Cooperative Forest Pest Management Program; 1983. 13 p.

M. A. Hulme's 45-page report "Biological Control in the Canadian Forestry Service" is available from the Environment Canada Distribution Centre, 151 Jean-Proulx, Hull, PQ K1A 1C7. Ask for DPC-X-11, catalog number FO 46-13/11. The report is also available in French, under the title "Le contrôle biologique au Service canadien des forêts."

The 1982 brochure on spruce budworm conditions in Northeastern North America is now available from Publications, USDA Forest Service, Northeastern Area, State and Private Forestry, 370 Reed Road, Broomall, PA 19008. Ask for

Kucera, Daniel R., and Robert G. Taylor. "Spruce budworms situation in 1982." Misc. Publ. 1436. Washington, DC: U.S. Department of Agriculture, Forest Service and Environment Canada, Canadian Forestry Service; 1983. 23 p.

Write to the American Society of Agriculture Engineers, P.O. Box 410, St. Joseph, MI 49085, for Barry, John W., and Robert B. Ekblad. "Forest Service spray drift modeling 1971-1982." Pap. No. 83-1006. St. Joseph, MI: American Society of Agricultural Engineers; 1983. 17 p.

These publications are available from the Forest Pest Management Institute, Box 490, Sault Ste. Marie, Ont. P6A 5M7

Kreutzweiser, P. D., and P. D. Kingsbury. 1982. "Recovery of stream benthos and its utilization by native fish following high dosage Permethrin applications." Information Report FPM-X-59.

Oliveri, K. W., and R. Dyce. 1983. "Spruce budworm in Maine. The 1982 Cooperative Spruce Budworm Suppression Project." Augusta, ME; Maine Forest Service, Department of Conservation.

In the Hopper

The summer of 1983 has been a hot one — especially for those of us trying to document the CANUSA Program in USDA series publications. We have received word of the shipping date for Dave Grimble and Ozzie Morris' Agriculture Information Bulletin 458, "Regional Evaluation of B.t. for Spruce Budworm Control." Copies of this and all other CANUSA-East publications will be available from the USDA Forest Service, Publications Department, 370 Reed Road, Broomall, PA 19008. Shipments should arrive from the press by mid-October.

Bruce Montgomery, John Dimond, John Witter, and Gary Simmons' manuscript "Insecticides for Control of the Spruce Budworm" has been assigned Agriculture Handbook No. 615 and is out for typesetting. We are hoping for late fall delivery.

The team of Dan Jennings, Dave Fellin, Harold Batzer, Mark Houseweart, and Roy Beckwith provided us with "Techniques for Measuring Early-Larval Dispersal of Spruce and Jack Pine Budworms," which has been assigned Agriculture Handbook No. 614. Although written by joint CANUSA-East and -West contributors, the book will be available to all requesters from the Broomall address given above. This manuscript is also out for typesetting at press time (late July) and should reach the Broomall supply room late this fall.

Paul Adamus's "Techniques for Monitoring the Environmental Impact of Insecticides on Aquatic Ecosystems," Agriculture Handbook No. 613, should appear around the same time. This is a lengthy book with three large tables that cross reference just about all the significant literature on the subject. For example, if you wanted to learn something about Ponar grabs, this handbook would tell you what kinds of sampling they could be used for and how well they would perform in different applications. Another table analyzes 43 published studies on

insecticide impact, giving the theme of the study, its sampling methodology, the component measured, and various study parameters including pesticide used.

The David Tilles/Norman Woodley manuscript "Spruce Budworm Parasites in Maine: A Reference Manual for Collection and Identification of Common Species" has just been assigned Agriculture Handbook Number 616. This is another lengthy book, with 54 black-and-white drawings and photos and two large keys: one to the adult stages of common budworm parasites in Maine and the other to puparia of common Dipteran parasites of the budworm in Maine. The text should be in print this winter.

These typescripts, received in the last 2 weeks of July, have just begun their journey through the printing process:

Dennis Bradley — Using Computer Simulation to Evaluate Mechanized Harvest Systems.

John Dimond, Robert Seymour, and Gordon Mott — Planning Insecticide Application and Timber Harvesting in a Spruce Budworm Epidemic.

Ozzie Morris, John Dimond, Frank Lewis, and Wladimir Smirnoff — Guidelines for the Operational Use of *Bacillus thuringiensis* Against the Spruce Budworm.

Robert Marty — A Guide to Economic Evaluation of Spruce Budworm Management Opportunities.

These handbooks will appear throughout the winter of 1983-84, in time for most of CANUSA-East's technology transfer meetings and workshops.

Future *Newsletters* will include delivery dates as we receive them from our printing specialists.

To get more information or to have your name added to the mailing list for the *Newsletter*, contact:

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